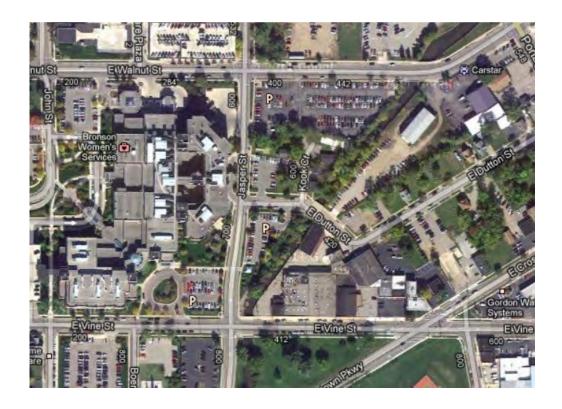
Portage Creek Sediment Remediation Project Kalamazoo, Michigan

Pre-Sediment Removal Structure Feature Assessment Removal Areas SA5-A and SA5-B



Prepared For:



Prepared By:



F&V Project Number: 809930 August, 2012

General Notes:

- The following list of structures was generated based on a field review of the removal area supplemented with a review of available construction records. It may not be an exhaustive list of constructed features in the removal area. If additional constructed features are encountered during sediment removal operations, F&V should be notified of the discovery to allow for review of their potential impact on the project.
- Pre-Sediment Removal review was focused on the channel and bank areas, including structures potentially impacted directly by the removal of sediment. There are other structures in the general project area which should be avoided or protected from damage from construction equipment during removal and transportation of sediment.
- As is the case when undertaking any underground work, Miss Dig should be contacted to locate active utilities in the project area prior to commencing removal operations.

Designation: SA5-A-S01

Location: SA5-A-S01 is the Dutton Street Bridge over Portage Creek.

Description: SA5-A-S01 is a single span bridge with side by side box beam with concrete deck,

sidewalks and parapet railings on concrete curtain wall abutments, which are

supported by steel piles. It was constructed in 1993.

Pre-existing Condition:

• Gabion baskets support the adjacent banks. They are in fair condition. There is a 12" CMP outlet through the southeast and northeast. The gabion basket in the southwest is failing into the channel. The northwest and northeast gabions are overgrown.

- There is a gas main supported along the south fascia and water main on the north fascia. There is an overhead crossing over the north side of the structure.
- Approach sidewalks have settled ~2.5" to 4" with asphalt wedging placed to mitigate settlement.
- The asphalt approach pavement has moderate cracking. Minor spalling was noted along the reference lines. Asphalt wedging has been placed at the structure to mitigate settlement.
- The concrete deck has ~4 lines of moderate to severe longitudinal cracking.
- Minor spalling was noted in the center of the south sidewalk.
- Grout forms were left in place between concrete box beams.
- Concrete slope paving has failed on the east side and is mostly failed on the west side (~5' slab).
- According to the bridge plans, there is an abandoned underground sanitary sewer crossing just south (upstream) of the structure.

Protective Measures:

- We understand a cofferdam will be constructed on the north side of the bridge to allow dewatering for sediment removal. Because the structure is supported on deep foundations, it is less susceptible to vibration and settlement than structures supported on shallow foundations. However, the gabion baskets are susceptible, especially in their deteriorated condition. Therefore, it is recommended that if sheet pile is used, it be installed with a minimum 4' clearance to the bridge and 6' to the baskets with the gaps filled with sand bags.
- If excavation is performed on the south side of the bridge, it should be confirmed that the sanitary sewer crossing has been abandoned.



Structure viewed from the northwest approach area



Elevation view of the structure



Gabion baskets in the southeast



Failing gabion basket



CMP outlet through gabion basket



Gabion baskets in the southeast



Asphalt wedging placed to mitigate approach sidewalk settlement



Asphalt wedging placed to mitigate approach sidewalk settlement



Asphalt wedging placed to mitigate approach settlement



Longitudinal cracking in concrete deck



Minor corner spalling on sidewalk



Trash and treefall in channel area



Tree caught in channel beneath structure



Grout forming left in place between box beams



Failing concrete slope paving beneath the structure



Failing concrete slope paving beneath the structure



Failing concrete slope paving beneath the structure



Failing concrete slope paving beneath the structure



Water main supported along north fascia



Overgrown gabion basket in northwest



Overgrown gabion basket in northeast



Failing gabion basket in the northeast

Designation: SA5-A-S02

Location: SA5-A-S02 is at the top of the east bank of Portage Creek running north from the

Dutton Street Bridge.

Description: SA5-A-S02 is a chain link fence with barb wire.

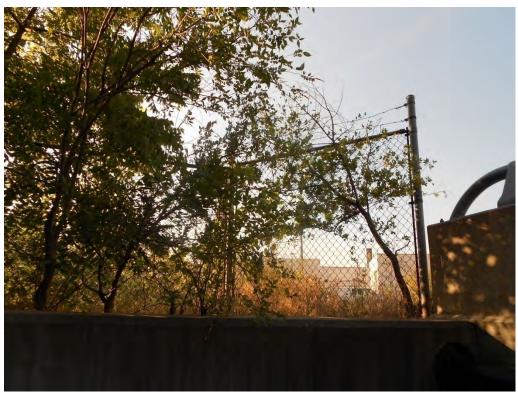
Pre-existing Condition:

• Most of the fence is overgrown with trees and brush.

• Several sections of fence are failed or failing.

Protective Measures:

• Remove and replace fencing in kind as required.



View of fence at Dutton Street from the channel



Overgrown fencing



Overgrown fencing



Failing section of fencing

Designation: SA5-A-S03

Location: SA5-A-S03 is at the top of the west bank of Portage Creek starting north of the

Dutton Street Bridge.

Description: SA5-A-S03 is a chain link fence.

Pre-existing Condition:

• Most of the fence is overgrown with trees and brush.

- Several sections of fence are bowed.
- There is a failed parking block at the north end of the fence.

Protective Measures:

• Remove and replace fencing in kind as required.



Overgrown fencing



Overgrown fencing



Overgrown fencing



Overgrown fencing

Designation: SA5-A-S04

Location: SA5-A-S04 is at the top of the west bank of Portage Creek at the north end of the

chain link fence, approximately 150' north of Dutton Street.

Description: SA5-A-S04 is a single story CMU storage building.

Pre-existing Condition:

Minor to moderate step cracking was noted in exposed areas of CMU walls.

- The corner of the building is approximately 8' from the creek bank.
- The wood soffit has a number of holes.
- There is a sink hole in the concrete approach on the north side.
- The east side of the building is overgrown.

Protective Measures:

• The building appears to be located far enough from the excavation area that no special protective measures will be required. However, the building should be protected with construction fencing or similar to identify the structure to operators and drivers.



Tree growth encroaching on the structure



Penetration in CMU wall



Step cracking in CMU wall



Overgrown wall and fencing



View of the structure looking west



Step cracking in corner of building



Damaged siding on north wall of building



Settlement of concrete approach in northeast



Hole in soffit



Damaged siding on north wall of building



Holes in soffit of building



Holes in soffit of building



View of structure looking southeast



View of south wall looking east

Designation: SA5-A-S05

Location: SA5-A-S05 is at the top of the west bank of Portage Creek approximately 175' north

of Dutton Street.

Description: SA5-A-S05 is a concrete driveway slab with CMU edging.

Pre-existing Condition:

The concrete slab has moderate cracking throughout.

• There is a row of deteriorated sand bags along the edge of the slab and failed silt fence beyond.

Protective Measures:

- Based on the cracking exhibited by the slab, it is likely not sufficient for construction traffic
 and should be avoided during the work, protected with construction fencing or similar. If it
 cannot be avoided, areas damaged during construction should be removed and replaced in
 kind.
- The edge of slab appears to be sufficiently removed from the channel such that it will not be impacted by sediment removal.



View of slab looking north



Cracking in concrete slab



Sand bags and silt fence along east end of slab



View of slab looking west

Designation: SA5-A-S06

Location: SA5-A-S06 is located on the east bank of Portage Creek a few feet above the water

line at the north end of the chain link fence.

Description: SA5-A-S06 is a 12-inch CMP outlet.

Pre-existing Condition:

The pipe has moderate corrosion. It is crushed and failed.

• The bank around the outlet has moderate to severe undercutting.

Protective Measures:

• Based on the apparent minor plunge pool, it appears that the outlet still carries a small amount of water. Therefore, cutting off the damaged and undercut portion of the pipe is recommended to accommodate sediment removal.



View of outlet from channel



Close-up view of CMP outlet

Designation: SA5-A-S07

Location: SA5-A-S07 is located on the east bank of Portage Creek approximately 200' north

of Dutton Street.

Description: SA5-A-S07 is a large concrete mass of unknown purpose. It may have been placed

for bank protection or to function as a curb for parking in the area.

Pre-existing Condition:

• The concrete is severely undermined at the north end and moderately undermined elsewhere.

• The concrete has scattered cracking and spalling.

Protective Measures:

 It is recommended that the property owner be contacted to determine whether the structure can be removed and either eliminated or replaced in kind to facilitate sediment removal operations.



Undermining at south end of concrete



View of concrete looking northeast



Severe undermining on north end of concrete



View of structure looking south

Designation: SA5-A-S08

Location: SA5-A-S08 is located along the east bank of Portage Creek south of Walnut Street.

Description: SA5-A-S08 is a retaining wall composed of steel solder piles and concrete panels.

Pre-existing Condition:

- There is significant erosion and cracking at the south end of the wall.
- The wall leans significantly toward the channel.
- There is significant vegetative growth through the joint above the waterline.
- Moderate surface corrosion was noted on steel piles.
- The second pile from the south leans approximately 20 degrees. The second panel from the south is failing with an exposed and broken strand at the north end. The south panel is partially failed. The third panel from the south to the north end is in fair condition.
- The wall is overgrown.

Protective Measures:

- Because of the severe condition of the south end of the wall and unknown depth of concrete panels, it is recommended that a minimum 6' clearance be maintained during sediment excavation.
- It may be effective to construct a cofferdam parallel to the wall and brace the existing wall during sediment removal, especially if equipment is to be placed behind the wall during the work.



Critical cracking in the top of panel at leaning soldier pile



Severe to critical spalling of concrete panel at solder pile



Top of wall overgrown with brush



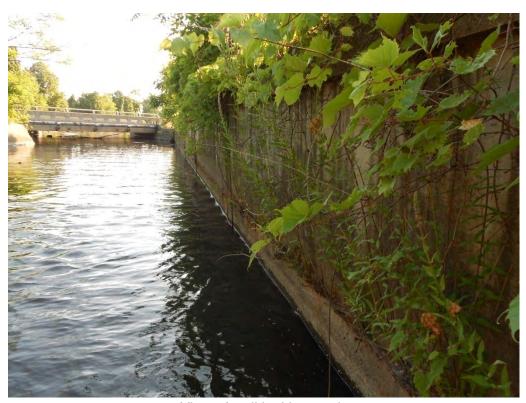
Cracking and spalling on concrete panel at leaning soldier pile



Overgrown and leaning wall looking north



Severe spalling of panel at waterline with failed strand



View of wall looking north



View of northern area of wall



View of wall looking south

Designation: SA5-A-S09

Location: SA5-A-S09 is located along the west bank of Portage Creek south of Walnut Street.

Description: SA5-A-S09 is a concrete retaining wall.

Pre-existing Condition:

- There is moderate bank erosion around the south end of the wall.
- There is a moderate to severe vertical crack in the center of the wall.
- An abandoned timber guardrail post remains at the top of the south area of the wall.
- The top of wall has a concrete curb with small circular penetrations and scattered moderate vertical cracking.
- The wall has hairline map cracking and popouts throughout.

Protective Measures:

• It is recommended that a minimum 4' clearance be maintained during sediment excavation.



Erosion around south end of wall



View of wall looking north



Cracking and scaling in wall surface



Curb area with circular penetrations



Vertical crack in center of wall



Joint between concrete wall and block wall of bridge

Designation: SA5-A-S10

Location: SA5-A-S10 is the Walnut Street Bridge over Portage Creek.

Description: SA5-A-S10 is a single span side by side box beam bridge with asphalt wearing

surface, concrete sidewalks and parapet railings. It is supported on concrete curtain walls with steel piles. The bottom of footing is approximately 8.5' below bottom of

beam. It was constructed in 1985.

Pre-existing Condition:

- The block wall in the southeast is overgrown with cracking along the joint with the adjacent concrete wall. There is a sink hole behind the wall in the southeast at the south end. It is covered with concrete at the surface but has a void at the waterline. Block walls in the northeast and northwest are in fair condition with scattered vegetation growth through cracks and joints.
- There is a gas main supported along the south fascia and water main along the north.
- Hairline horizontal/map cracking was noted in the box beam fascias. Efflorescence and stalactites were noted along several box beam joints.
- There is a concrete outlet through the face of the abutment.
- The asphalt wearing surface has severe cracking and spalling, which is partially sealed and cold patched.
- The concrete sidewalk has hairline map cracking. Approach sidewalk has settled ~1-1.5" at the structure. Severe map cracking with shallow spalling was noted in the northwest sidewalk and moderate longitudinal cracking in the north sidewalk.
- Asphalt approaches have sealed longitudinal and transverse cracking and block cracking.
- Minor dents were noted in the northwest tube railing.

Protective Measures:

Because the structure is supported on deep foundations, it is less susceptible to vibration
and settlement than structures on shallow foundations. However, the block walls are
susceptible. Therefore, a minimum 4' clearance is recommended for the bridge and 6' for
the block walls. Gaps between the cofferdam and block walls should be sealed with sand
bags to avoid disturbing them.



View of structure from southeast approach



Elevation view of structure



Southwest block wall overgrown



Gaps in blocks along waterline and joint to abutment



Void along waterline at southeast block wall



Void along waterline at southeast block wall



Vegetation growth through southeast block wall



Hairline horizontal cracking in box beam fascia



Hairline horizontal and map cracking in box beam fascia



Concrete outlet through abutment wall



Efflorescence and stalactites along box beam joint



Sealed cracking and spalling in asphalt surface



Cracking in concrete sidewalk



Cracking and spalling in asphalt surface



Scaling/spalling in northwest sidewalk



Water main supported along north fascia

Designation: SA5-B-S01

Location: SA5-B-S01 is the Vine Street Bridge over Portage Creek at the south end of area

SA5-B.

Description: SA5-B-S01 is a single span bridge with side by side box beams, asphalt wearing

surface, concrete sidewalks and concrete parapet railings. The superstructure is carried by cast in place concrete abutments on cast in place concrete piles. The

bridge was constructed in 1988.

Pre-existing Condition:

• Refer to the feature assessment for area SA5-C (structure SA5-C-S11), as the Vine Street Bridge represents the dividing line between the two areas.

Protective Measures:

- We understand that sediment removal is not planned on the north side of the Vine Street Bridge. However, if plans change, the structure is supported on deep foundations and is less susceptible to vibration and settlement than structures on shallow foundations. A minimum 4' clearance is recommended to the bridge, however the retaining wall in the northeast and gabion baskets in the northwest are more susceptible and a minimum clearance of 6' should be maintained with sand bag connections for the cofferdam.
- There is an 8" sanitary sewer crossing approximately 10' north of the northeast abutment and 25' north of the northwest abutment. It is a ductile iron pipe beneath the channel and clay beyond. Comparison of the bridge plans to the utility plans indicate the top of pipe is approximately 6.5' below the bottom of beam, which would indicate approximately 2.5' of cover. If excavation is performed in the area, it is recommended that the manholes on either side of the crossing be used to establish its line and opened to confirm its depth. If the main falls within the excavation area and within 12" of the excavation depth, it should be hand excavated or the area avoided. A minimum clearance of 4' is recommended for driving sheet pile near the crossing, if required.



View of structure from southeast approach area



Elevation view of structure

Designation: SA5-B-S02

Location: SA5-B-S02 is located on the west bank of Portage Creek, approximately 50' north of

Vine Street.

Description: SA5-B-S02 is a 30-inch diameter concrete outlet.

Pre-existing Condition:

• The concrete slope paving above the outlet has moderate to severe undermining.

• Stone riprap around the outlet has settled into the channel, exposing geotextile fabric in several areas.

Protective Measures:

• We understand that sediment removal is not planned in area SA5-B. However, if plans change, the outlet should be isolated with a cofferdam to allow for dewatering. The cofferdam should be installed with a minimum 2' clearance to the outlet.



View of outlet from the channel area



Undermined slope paving at the top of bank



Exposed geotextile fabric from failed riprap

Designation: SA5-B-S03

Location: SA5-B-S03 is located on the east bank of Portage Creek, running north from Vine

Street.

Description: SA5-B-S03 is a concrete retaining wall supporting an asphalt parking lot.

Pre-existing Condition:

• There is a severe vertical crack 5' north of the south end of wall and possible exposed footing with slight undermining.

- Form ties are exposed and corroded along the face of wall.
- Moderate vertical cracking was noted 9' and 12' north of the south end of wall.
- The asphalt parking lot has moderate to severe cracking throughout with vegetation growth through the cracks.
- There are several outlets through the face of wall. An area of suspected footing exposure was noted at the first outlet from the south, a 10" clay tile. Moderate cracking was noted in the tile. Severe vertical cracking was noted at the 2nd outlet from the south, an 8-inch clay tile. A 4" outlet is 3rd from south, located just above the waterline.
- There is severe bowing in the wall between the 3rd and 4th outlets from the south, apparently from form deflection during construction. There is a cold joint with spalling and honeycombing at the north end of the bowing.
- The 4th outlet from the south is an 8" clay tile with honeycombing around the outlet.
- The 5th outlet from the south is 6" PVC. There are voids and patching around the hole.
- · Scattered honeycombing was noted in the face of wall.
- There is an offset approximately 1.5" 19' north of the chain link fence.
- There is a 2.5"-3" gap at the north end of the concrete wall with voids approximately 18" deep and a moderate vertical crack at the joint with the adjacent sheet pile wall.

Protective Measures:

- We understand that sediment removal is not planned in area SA5-B. However, if plans change, a minimum 4' clearance should be maintained with the wall. It may be possible to install sheet piling parallel to the wall with bracing between during sediment removal, especially if equipment is to be placed behind the wall during the work.
- It is recommended that the sanitary manholes on each side of the channel be opened to establish the line and grade of the sewer as it crosses beneath the channel. Maintain a minimum 6' clearance to the sewer if sediment removal is required.



Moderate vertical cracking with vegetation



View of the wall looking north from the south end



Suspected exposed footing below the waterline



Vertical cracking in the concrete wall



Asphalt parking area supported by the wall and sanitary manhole



Cracking with vegetation in the asphalt parking area



Cracking with vegetation in the asphalt parking area



Settlement of asphalt pavement along retaining wall at cold joint



Clay tile outlet through wall



Suspected forming materials left in place along waterline



Spalling of wall from lack of cover on unknown object



Clay tile outlet through wall with vertical cracking



View of wall looking north



Outlet through wall just above waterline



Honeycombing and spalling along cold joint in wall



Honeycombing and spalling along cold joint in wall at waterline



Severe cracking and voids in wall at connection with sheet pile wall



Honeycombing in face of wall

Designation: SA5-B-S04

Location: SA5-B-S04 is located on the east bank of Portage Creek, approximately 100' north

of Vine Street.

Description: SA5-B-S04 is a chain link fence with barbed wire.

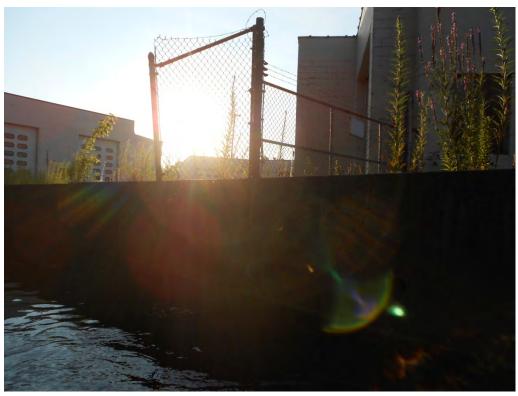
Pre-existing Condition:

• Significant channel debris was noted on the fence fabric.

- Corrosion was noted on post and fabric members.
- The fabric is warped and failed in several locations.

Protective Measures:

• Remove and replace the fence in kind if required.



View of fence from channel



Debris on fence fabric above waterline



Loose fabric and barbed wire on top of fence



View of fence from parking area

Designation: SA5-B-S05

Location: SA5-B-S05 is located on the east bank of Portage Creek, starting approximately

150' north of Vine Street extending north to the building in the southeast quadrant of

Portage Creek and Dutton Street.

Description: SA5-B-S05 is a sheet pile retaining wall. There is a concrete curb along the top of

the wall. The wall supports an asphalt parking area.

Pre-existing Condition:

• The sheet pile has moderate corrosion and scale at the waterline, minor elsewhere.

- There is an 8" clay tile outlet 11' north of the south end of the wall with moderate cracking along the invert.
- There is a sink hole in the asphalt behind the wall at the 8" clay outlet.
- The asphalt pavement has cracking with vegetation throughout.
- The steel angle support placed horizontally along the wall has moderate to severe surface corrosion and bowing.
- The concrete curb has minor to moderate vertical cracking at ~10' spacing.
- The sheet pile has separated from the concrete curb approximately 1-2".

Protective Measures:

• We understand that sediment removal is not planned in area SA5-B. However, if plans change, a minimum 4' clearance should be maintained with the wall. It may be possible to install sheet piling parallel to the wall with bracing between during sediment removal, especially if equipment is to be placed behind the wall during the work.



View of clay tile outlet from top of wall



Cracking with vegetation in asphalt parking area



Cracking with vegetation in asphalt parking area



Cracking with vegetation in asphalt parking area



Sink hole at corner of concrete curb



Severe cracking in concrete curb at north end of wall



Sheet pile separation from curb



Sheet pile separation from curb



Cracking and abrasion of concrete curb



Cracking and abrasion of concrete curb



Cracking and sink hole at corner of concrete curb



View of wall looking south



Clay tile outlet through wall



Cracking in invert of tile



Corrosion and scaling of sheet pile along waterline



North end of wall adjacent to building

Designation: SA5-B-S06

Location: SA5-B-S06 is located on the south side of Dutton Street along the east bank of

Portage Creek.

Description: SA5-B-S06 is a CMU storage building with access from Dutton Street and the

parking area south of the building.

Pre-existing Condition:

• Moderate step cracking was noted in the upper southwest corner of the building. Step cracking is typical around the overhead doors.

- The concrete foundation wall extends above the asphalt surface approximately 4' with CMU beyond.
- There is a tipped concrete bollard in the creek at the southwest corner of the building.
- There are several downspouts along the west wall with corrosion.
- There is an apparent false footing exposed in the southwest corner. The concrete foundation wall appears to extend below the false footing. The false footing is 12" thick extending ~17" from the face of foundation wall. The false footing is undermined, with the channel ~20" below the top of footing at the lowest spot.
- Heavy tree and brush growth was noted along the building where the bank is intact.
- There is severe step cracking in the west wall. The south half of the west wall is partially
 obscured by trees. The cracking appears to be approximately 1" wide and extends into the
 concrete foundation wall.
- Scattered moderate cracking (~4 total) was noted in the concrete foundation wall around the center of the wall.
- Minor step cracking was noted in the north end of the west wall.

Protective Measures:

- We understand that sediment removal is not planned in area SA5-B. However, if plans change, a minimum 6' clearance should be maintained with the west wall of the building. It may be possible to install sheet piling parallel to the wall with bracing between during sediment removal.
- The bollard in the channel can likely be removed, if required.



View of north side of building



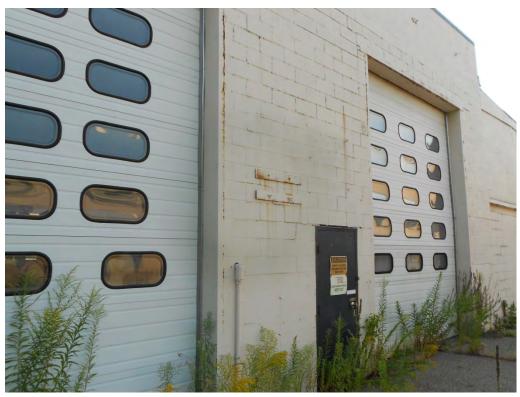
View of south side of building



Step cracking in upper west end of south wall



Step cracking in upper west end of south wall



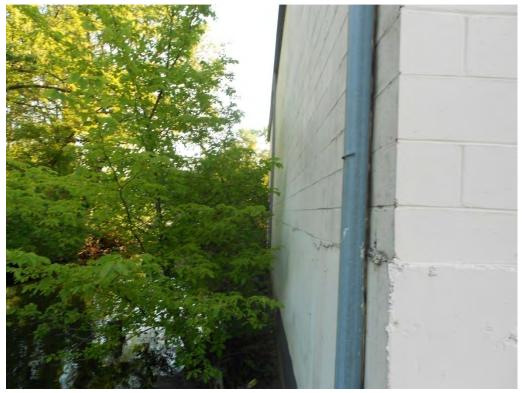
Overhead doors in south wall



Step cracking in south wall around overhead doors



Connection between concrete curb and southwest building corner



View of west wall from southwest corner



False footing along southwest foundation wall



Tipped bollard in channel near southwest building corner



Corrosion on downspout in southwest corner



West wall obscured by tree growth



Severe step cracking in west wall



Severe step cracking in west wall



Cracking in west wall and foundation wall



Cracking in west foundation wall



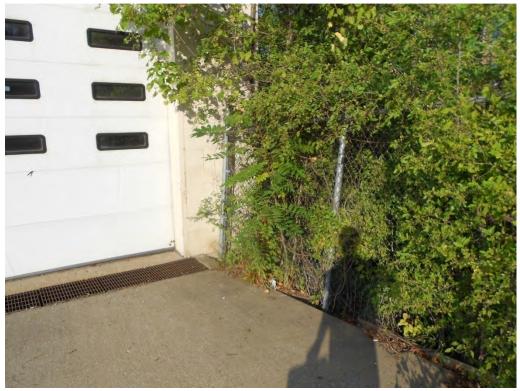
Bank failure along west wall



Step cracking in north end of west wall



Tree and brush growth around northwest corner of building



Overgrown fencing in northwest corner of building

Designation: SA5-B-S07

Location: SA5-B-S07 is the Dutton Street Bridge over Portage Creek.

Description: SA5-B-S07 is a single span bridge with side by side box beams and concrete deck,

sidewalks and parapet railings on concrete curtain wall abutments, which are

supported by steel piles. It was constructed in 1993.

Pre-existing Condition:

• Refer to the feature assessment for area SA5-A (structure SA5-A-S01), as the Dutton Street Bridge represents the dividing line between the two areas.

Protective Measures:

• We understand that sediment removal is not planned in area SA5-B. However, if plans change, a minimum 4' clearance should be maintained with the bridge and 6' with the gabion baskets. Gaps between sheet pile and gabions should be sealed with sand bags.



Structure viewed from the northwest approach area



Elevation view of the structure